

# The Gut Bridge

South Bristol, Maine



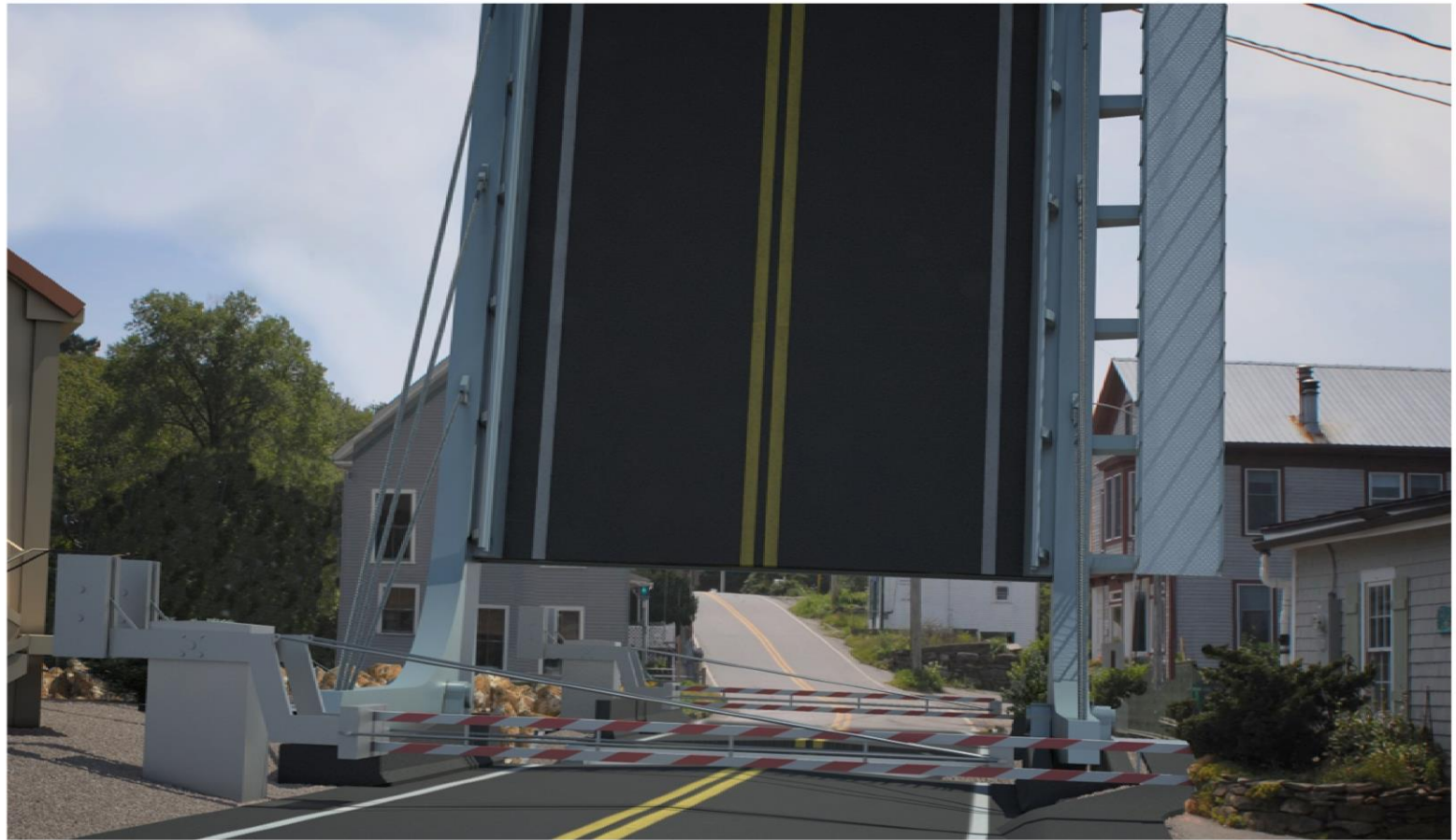
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*presented to:*  
The Town of South Bristol

August 1, 2013

## KEY DESIGN GOALS



- Reliable
- Maintainable
- Constructable
- Aesthetically Pleasing

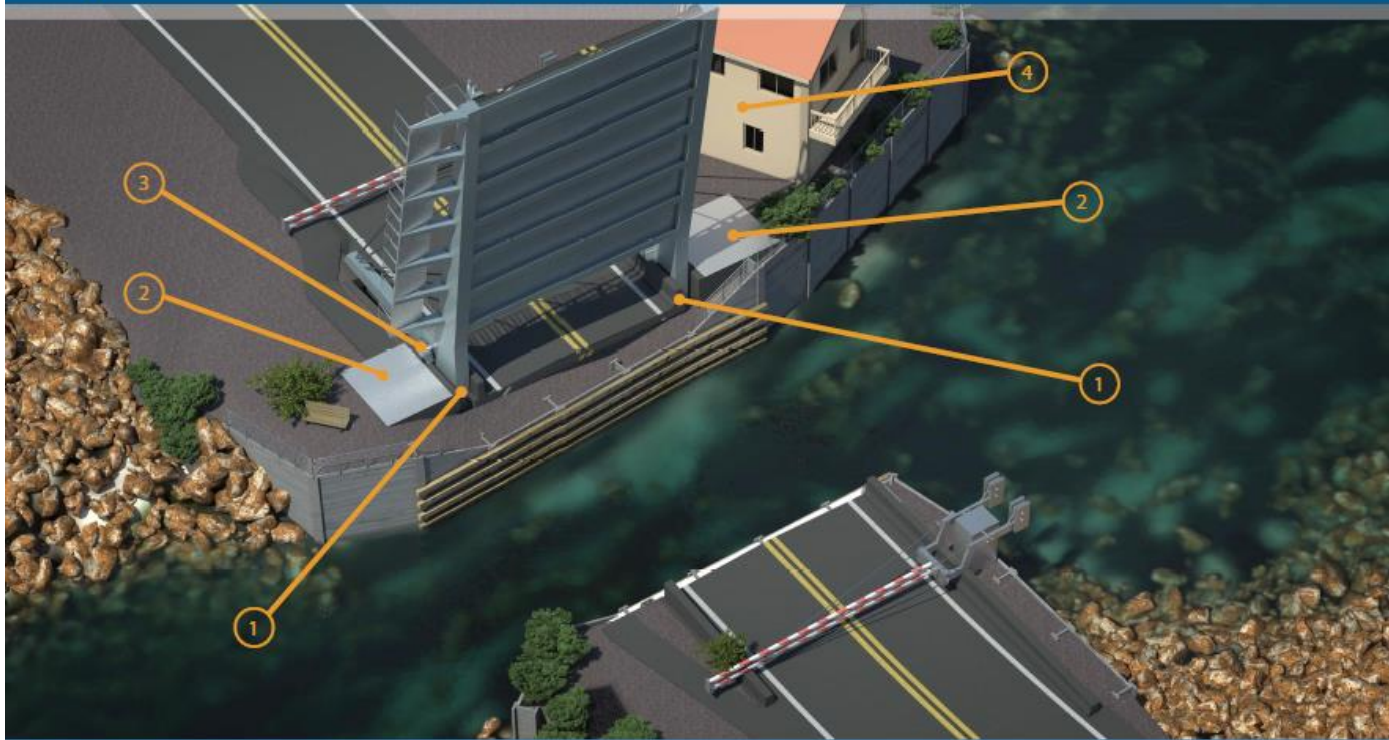


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# Operational Reliability



## KEY

- 1. Counterweight Pit Openings Above Predicted Highest Water Levels to Prevent Flooding
- 2. Fully Sealed Machinery Enclosures
  - Top Hatch Openings Above Predicted Highest Water Levels
  - Watertight Hatches for Access
  - Pinion Shaft Penetration Utilizes Marine Stuffing Box Seal
- 3. Main Trunnion Bearings Placed High
- 4. Electrical Drives
  - Protected in Operator's House

Protected Machinery & Electrical  
Components



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## KEY DESIGN GOAL – OPERATIONAL RELIABILITY

- Submersible Self-Lubricated Bearings Will Be Utilized
- Water-tight Seals/Housing for Trunnion Bearings, Reducers and Motors

### Machinery & Electrical Components Designed for Severe Marine Conditions



Pinion Shaft Stuffing Box to  
Seal Machinery Enclosure

- Bridge Can Be Operated With Utility Power Failure (With On-Site Back-up Generator)
- Bridge Can Be Operated With Back-Up Generator Failure  
(Use of Air Motor Operated From Vehicle Mounted Compressor Will Be Evaluated)
- Bridge Can Be Operated With From Single Set of Machinery If Motor Fails
- All Electric Drives Will be Fully Redundant – Allows Bridge Operation if Primary Drive Fails
- Multiple Pumps will be Utilized in Counterweight Pits & Machinery Enclosures To Remove Water

### Machinery & Electrical Component Redundancy

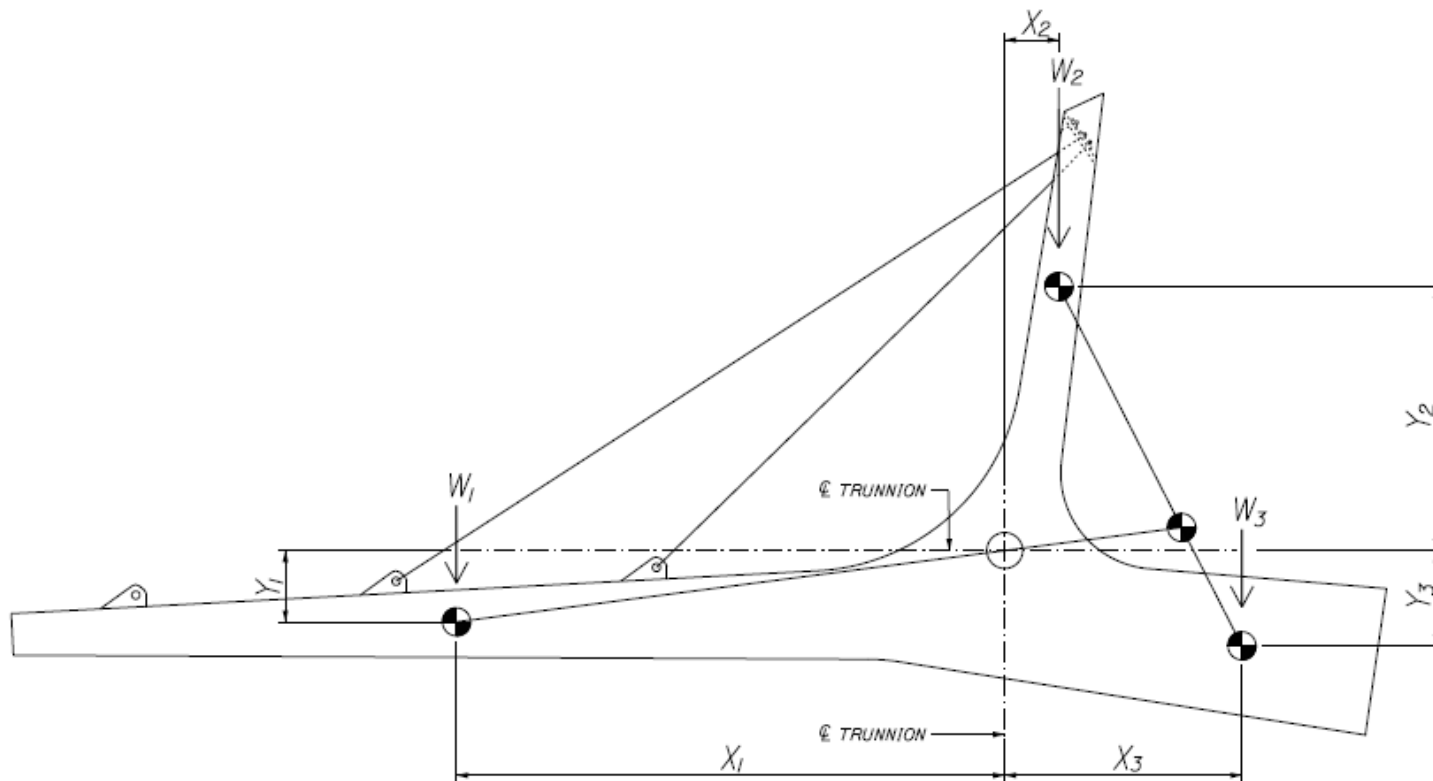


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## WHY BALANCE A MOVABLE BRIDGE?



### Horizontal Balance

$$W_1 \times X_1 = W_2 \times X_2 + W_3 \times X_3$$

### Vertical Balance

$$W_1 \times Y_1 = W_2 \times Y_2 + W_3 \times Y_3$$

- Safe Operation
- Ensures Reliable Operation
- Reduces Power Requirements and Costs

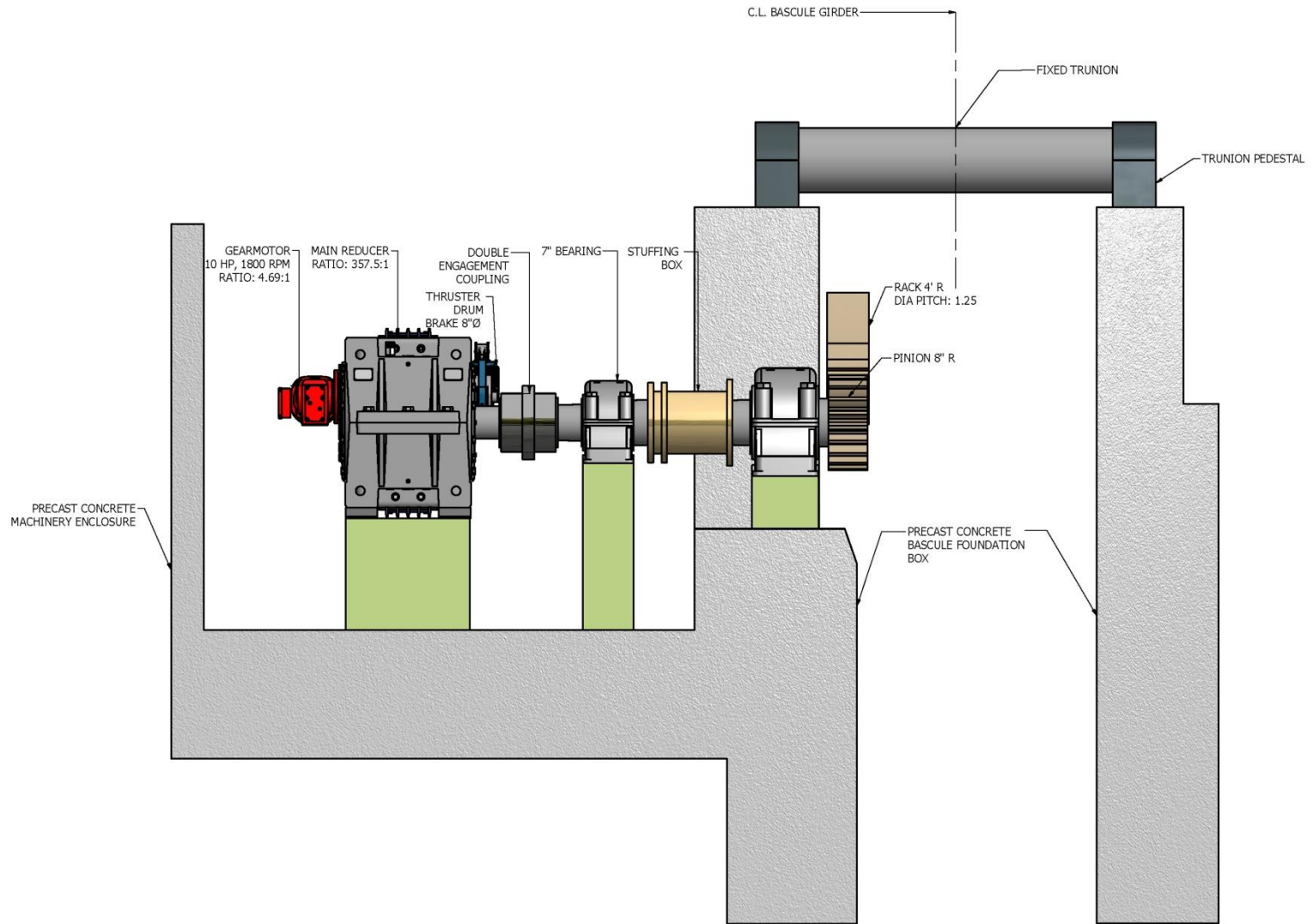


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# SPAN DRIVE MACHINERY



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## MAINTAINABLE



## Low Maintenance

- Box Girder Design Minimizes Corrosion Potential
- Hands-on Access to Key Components Provided
- Utilize Low Maintenance Designs For Mechanical & Electrical Components
  - Components Will Meet Heavy Duty Marine/Industrial Use
  - Self-Lubricated Sealed Bearings
  - Thru-Hardened Gear Reducers For Long Life



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# CONSTRUCTION ISSUES

- Staging
  - Minimize Construction During Winter Channel Closure
    - Stage I (Before Winter Channel Closure)
      - Construct Soldier Pile Walls Outside of Existing Bridge
      - Construct Abutments and Portion of Temporary Bridge Runaround
    - Stage II (During Winter Channel Closure)
      - Float-In Temporary Bridge Span over Channel
      - Demolish Existing Bridge
    - Stage III (During Winter Channel Closure)
      - Construct New Cable Stayed Bascule Bridge
    - Stage IV (After Winter Channel Closure)
      - Construct Operators House and Boat Ramp
- Site Conditions
  - Close Proximity to Adjacent Structures

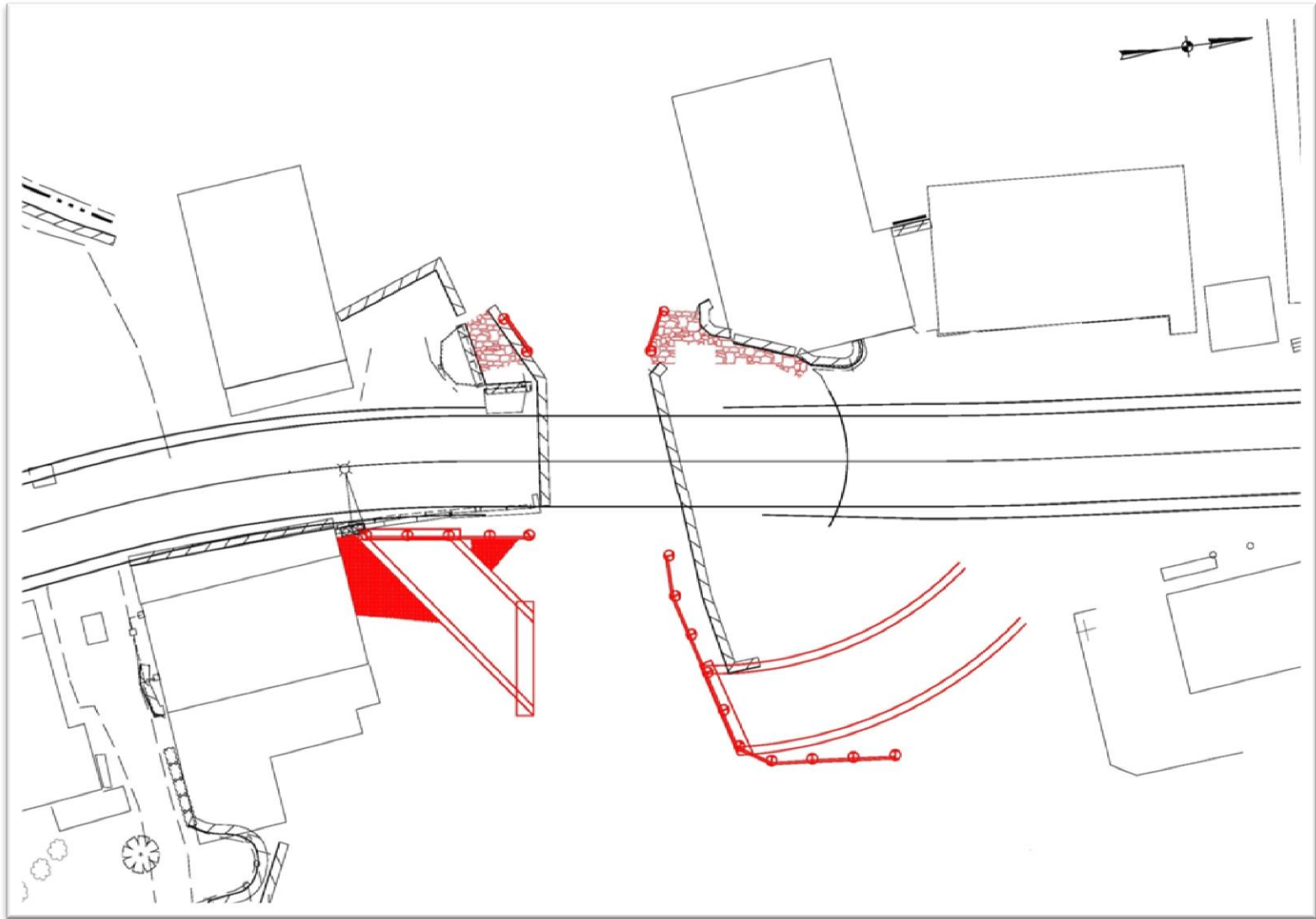


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## CONSTRUCTION STAGE I

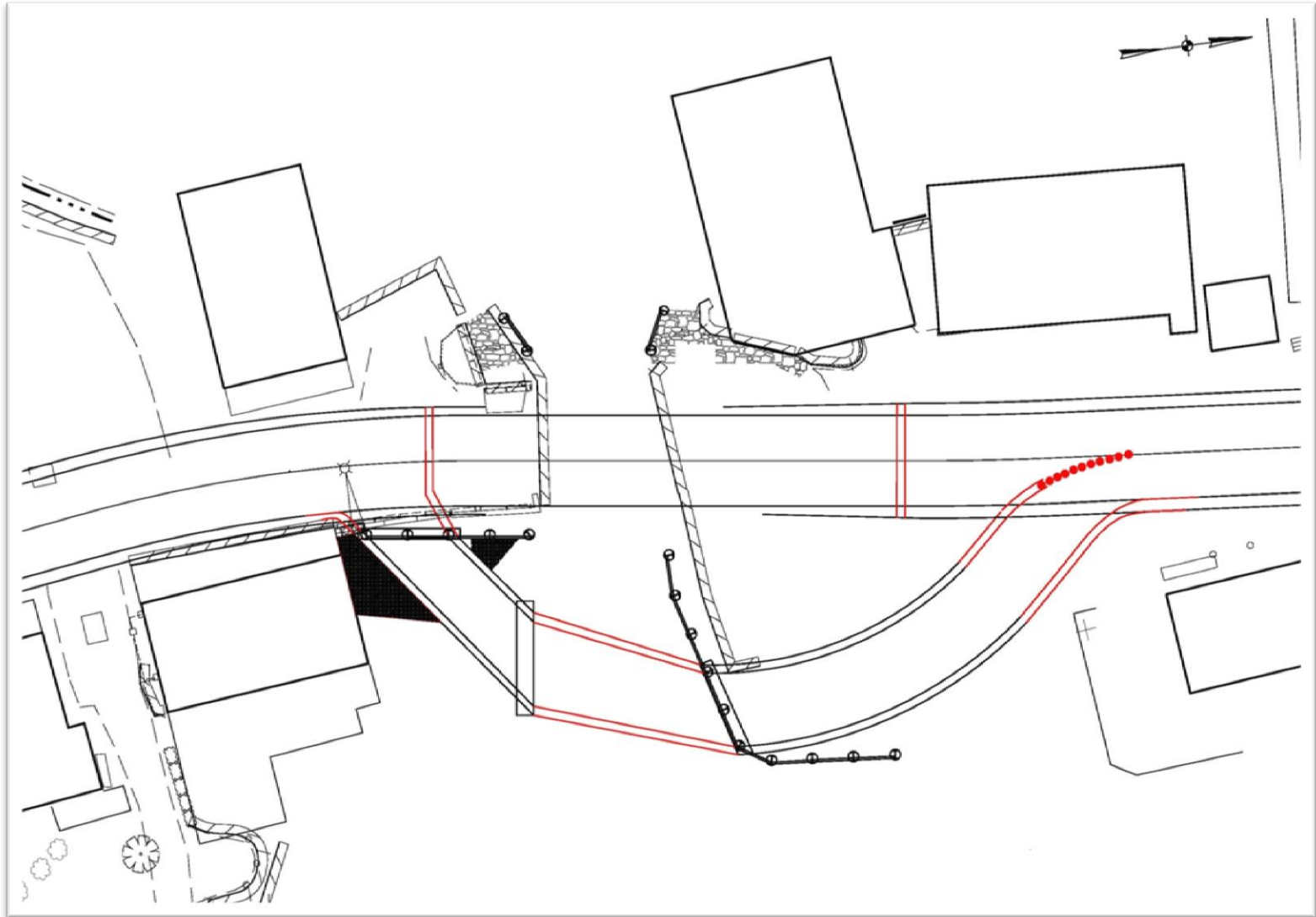


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## CONSTRUCTION STAGE II

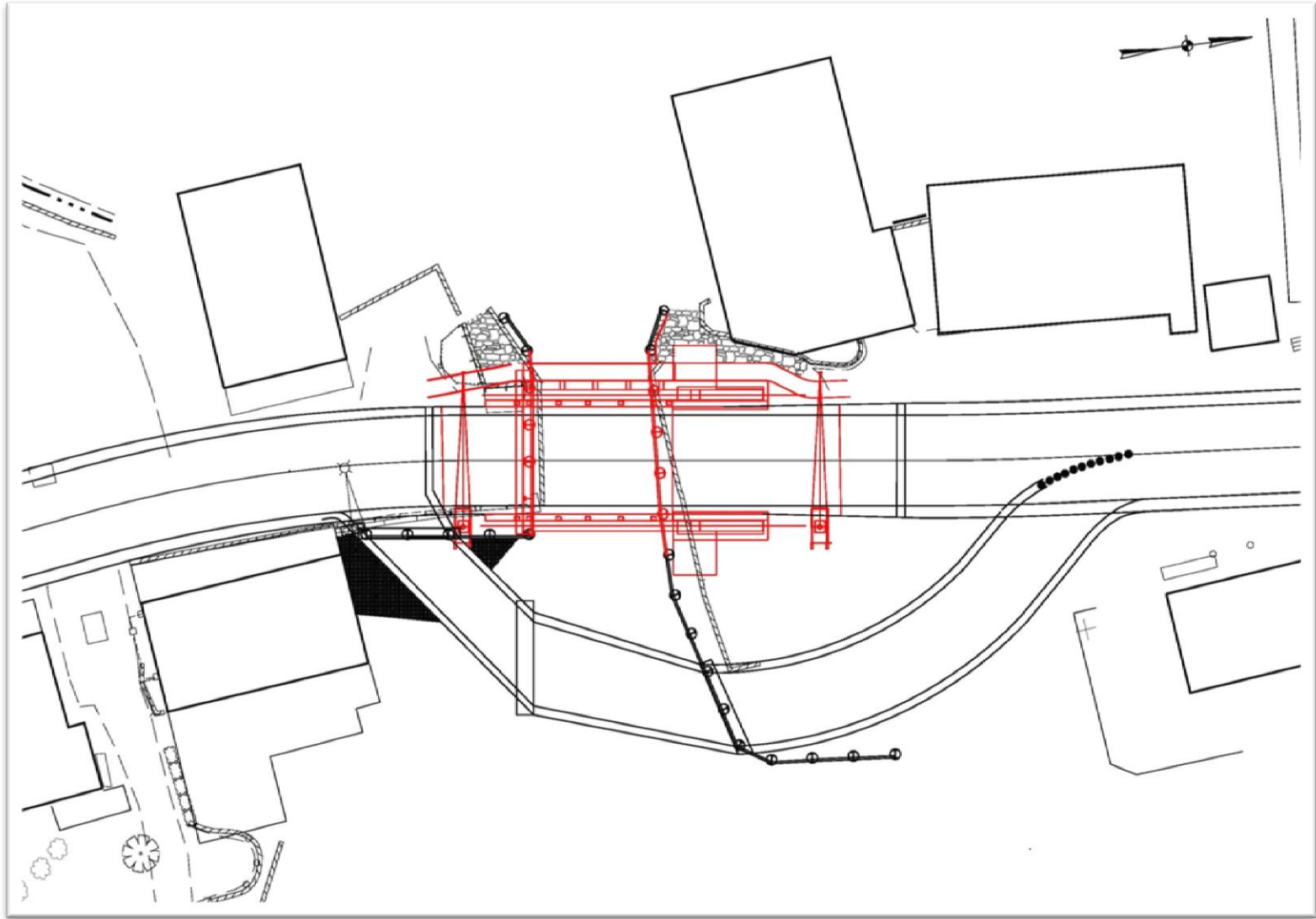


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## CONSTRUCTION STAGE III

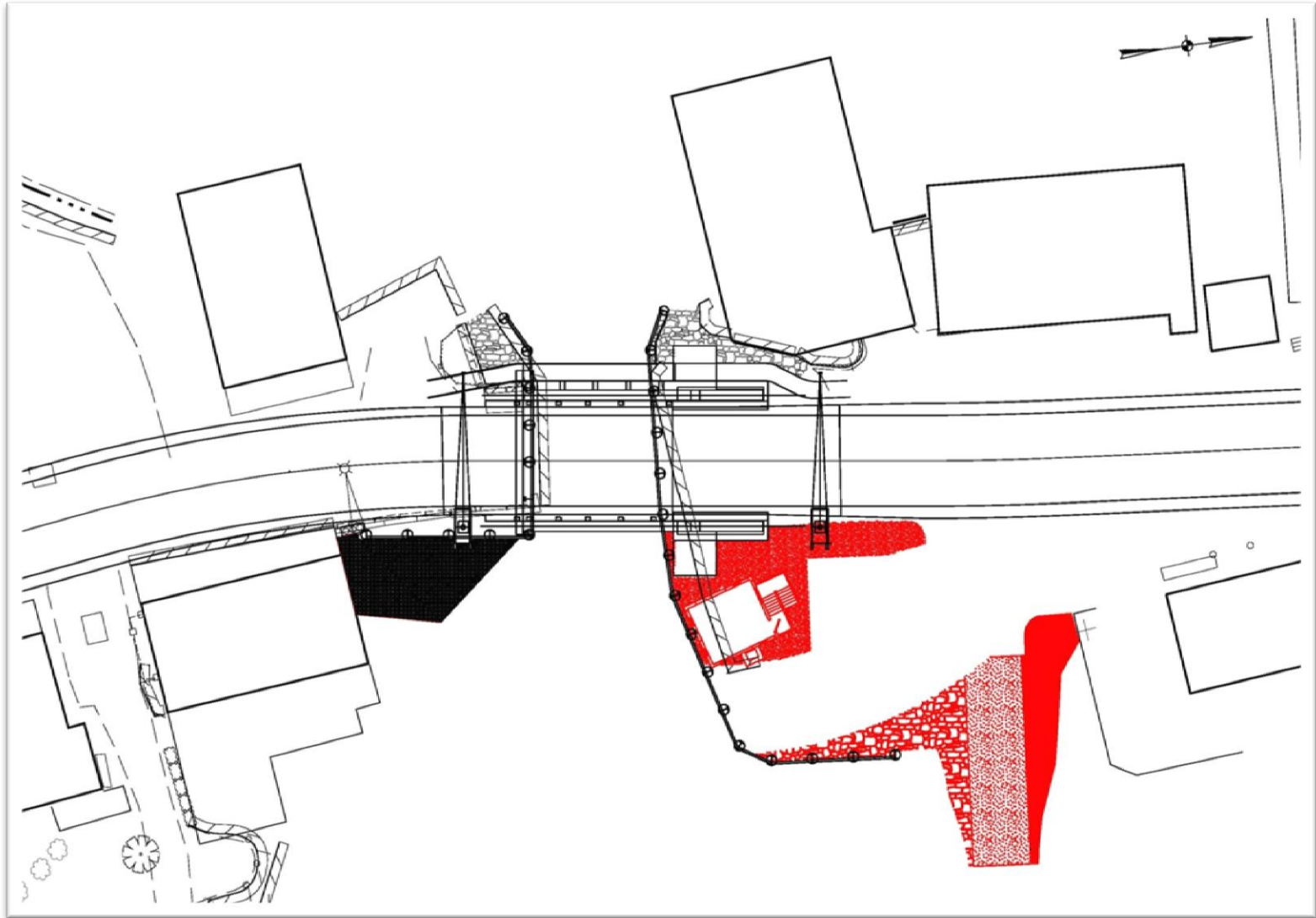


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## CONSTRUCTION STAGE IV



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## SITE CONDITIONS

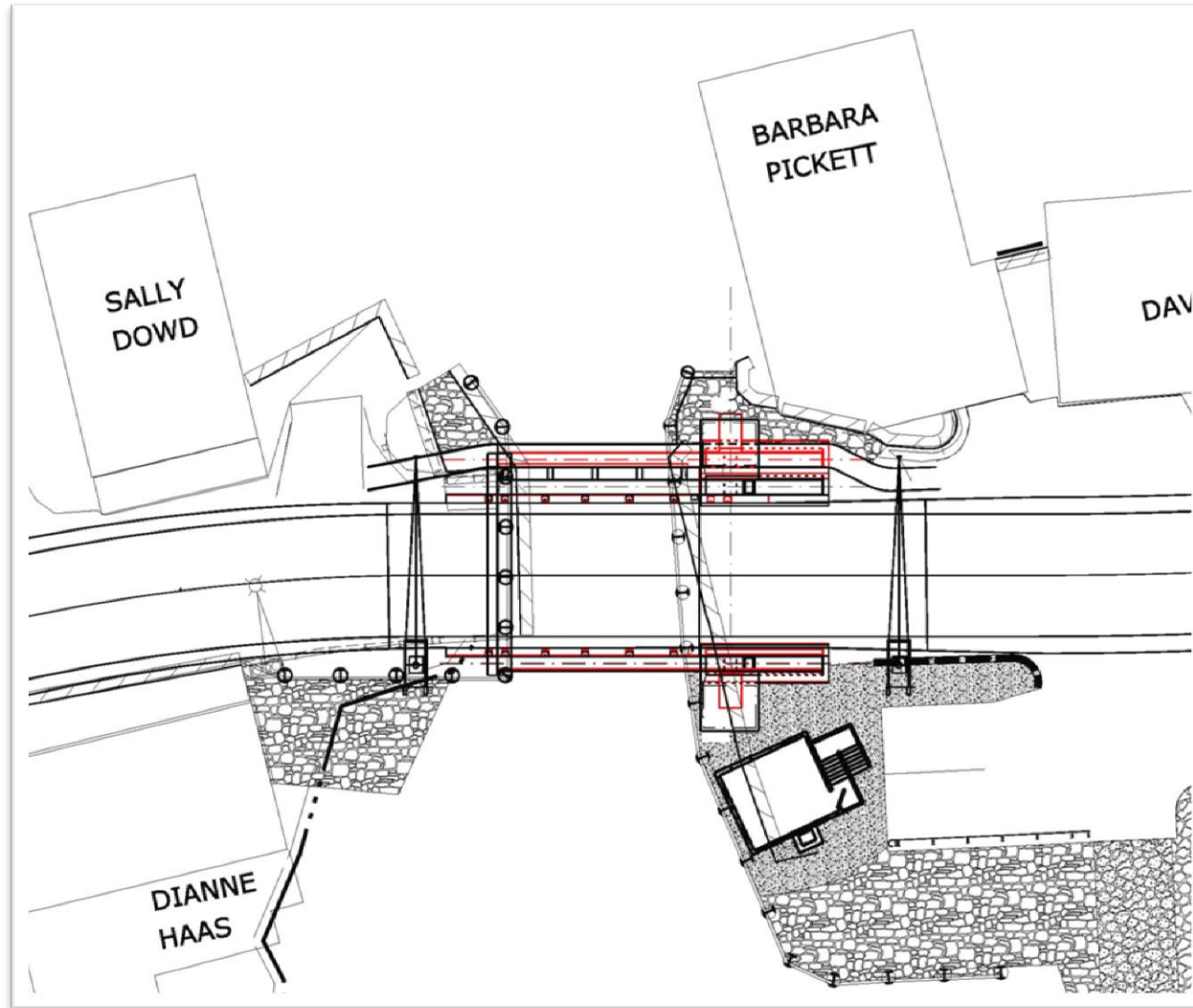


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## SITE CONDITIONS – OUTBOARD SIDEWALK MOVES FOUNDATIONS AWAY FROM ADJACENT HOUSE

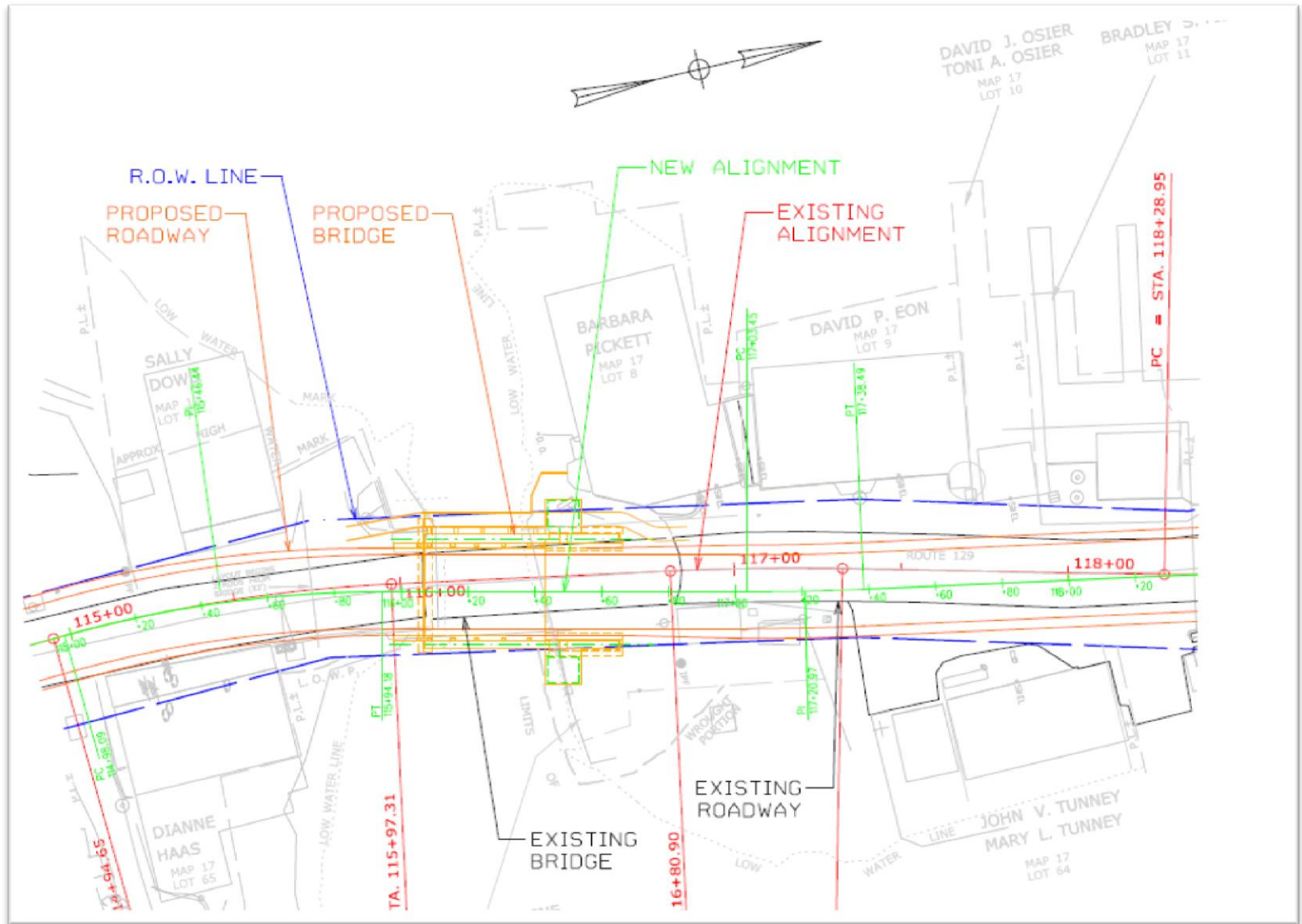


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# SITE CONDITIONS – OUTBOARD SIDEWALK MOVES FOUNDATIONS AWAY FROM ADJACENT HOUSE



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## PROJECT GOAL – ACHIEVE AN AESTHETICALLY PLEASING DESIGN



- Scale to Site



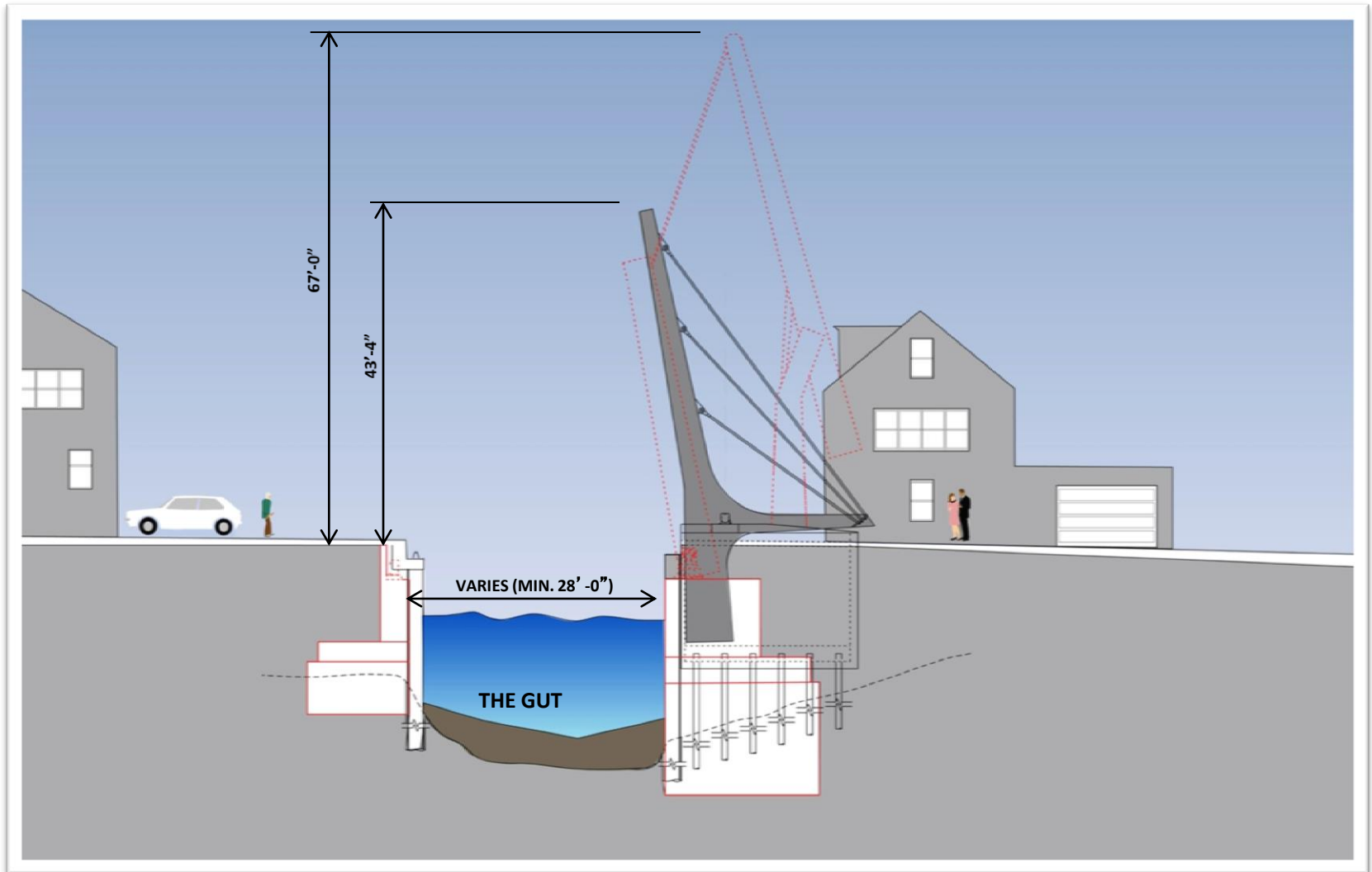
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## ELEVATION - OPEN POSITION



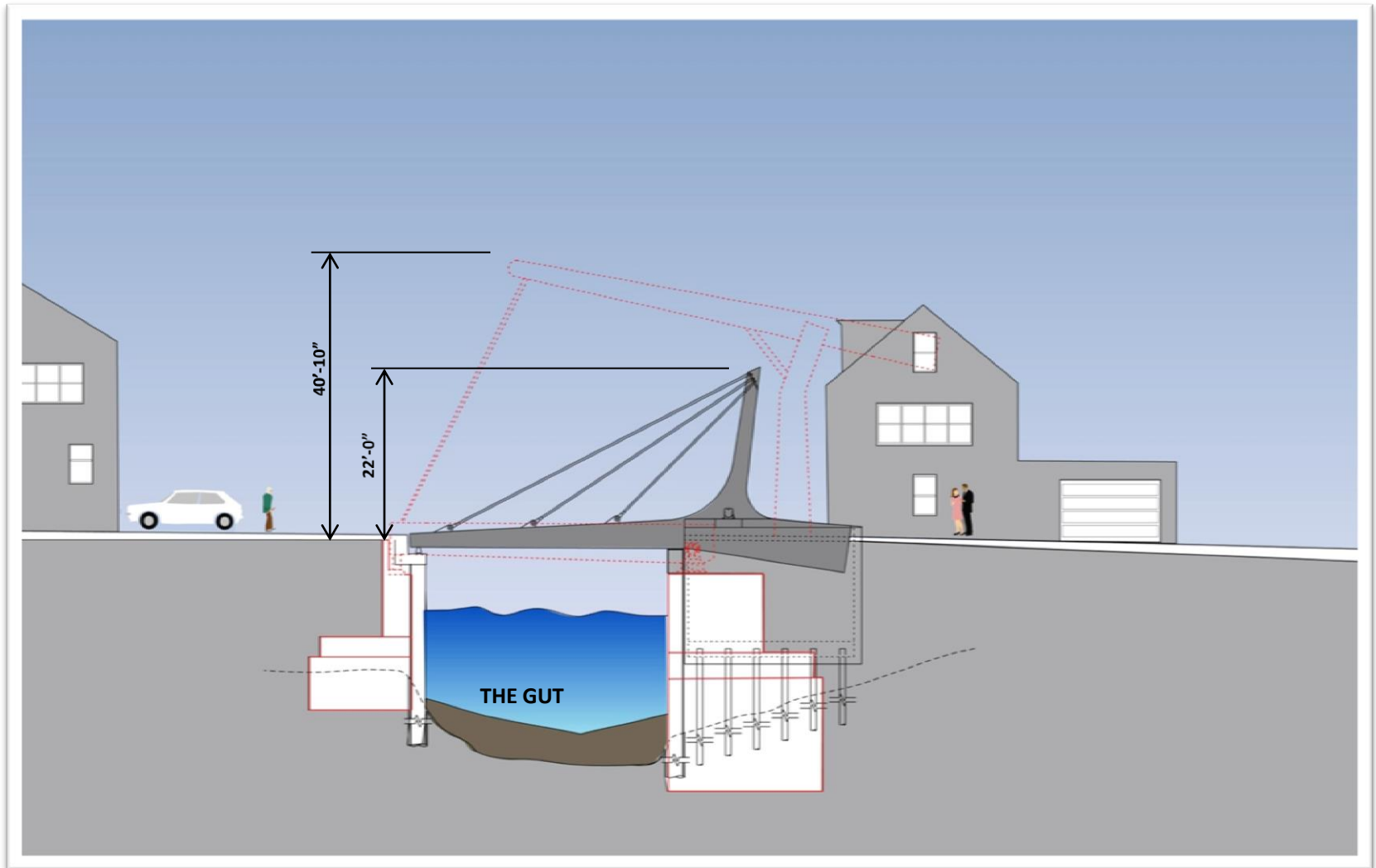
OVERLAY COMPARISON: Cable Stayed Bascule  
Bridge/Dutch Bascule



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## ELEVATION - CLOSED POSITION



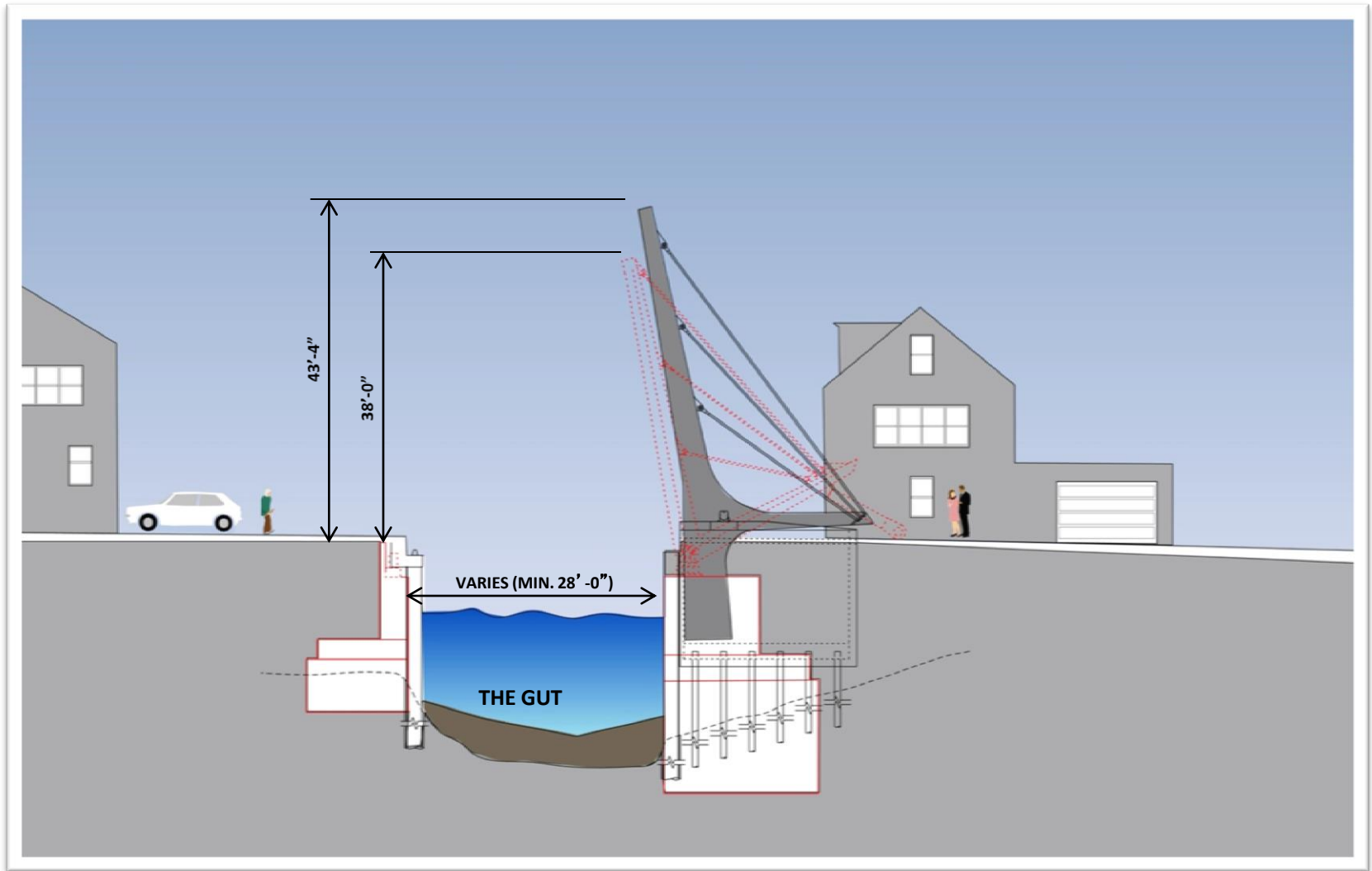
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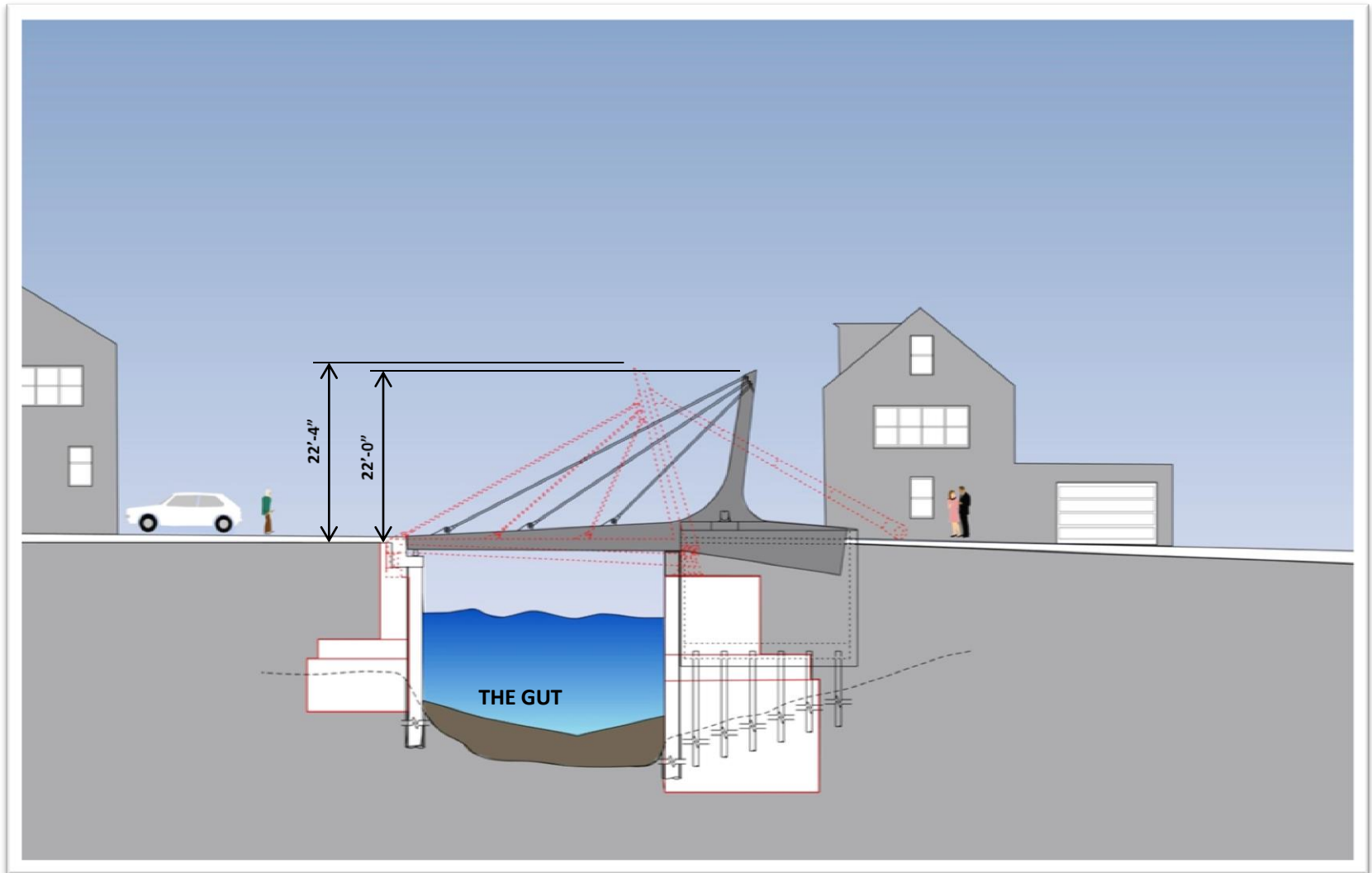
OVERLAY COMPARISON: Cable Stayed Bascule  
Bridge/Rosales Alternate Concept



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## MAINE DOT'S NEW BRIDGE DESIGN – THE GUT, SOUTH BRISTOL CABLE STAYED BASCULE BRIDGE



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